

TO: SERVICE MANAGER  TECHNICIANS   
PARTS MANAGER

No. 89-16

## B.M.W. Stern Drive/Inboards Model D636 Diesel Engines (Grey Engines) Overheating

If experiencing an overheating condition with a BMW D636 diesel engine, one of or a combination of the following conditions may be the cause.

### Check the following first:

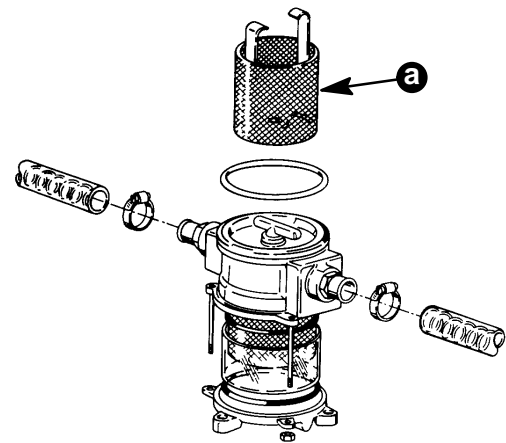
1. Check heat exchanger tank for coolant at proper level (1/2" – 3/4" [12mm – 20mm] below filler neck).
2. Check and compare temperature with an accurate independent instrument i.e. (possible malfunction of gauges, senders, wires, ground, etc.).
3. Pressure check cooling system and cap with automotive cooling system pressure tester. 14 PSI (100 kPa) required. Because old style coolant tank cap (single seal type) is vulnerable to leaking, recommend replacing with new style cap, P/N 63832A14.
4. Check engine circulating pump for possible malfunctions.
  - Loose/slipping alternator belt
  - Impeller vanes worn
  - Impeller shaft seal leaking
  - Impeller clearance to pump housing (.015" – .020"/.038mm – .050mm)

**NOTE:** Replace with new style pump, P/N 46-814255, if necessary.

5. Check engine coolant concentration to ensure 50/50 mixture.

**NOTE:** –34° F (–37° C) indicates a 50/50 mix. Use Quicksilver pre-mixed antifreeze P/N 92-813054A2 or an equivalent low-silicate brand. Using antifreeze other than Quicksilver Engine Coolant a low silicate 50/50 pre-mixed coolant with proper additives and manufactured for diesel engines must be used.

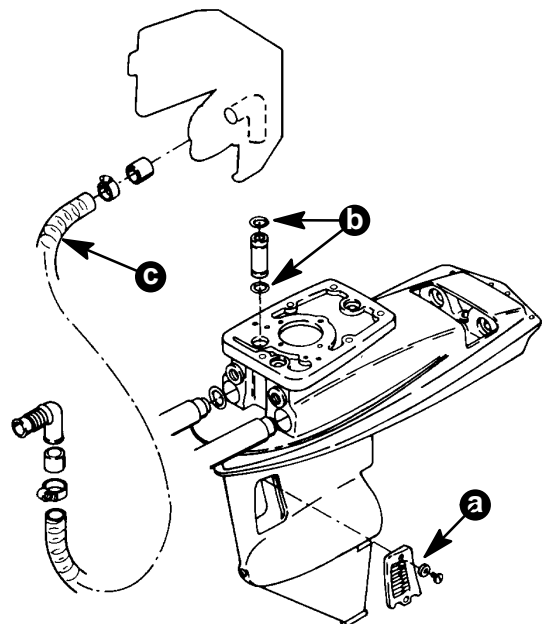
6. Check for raw water intake problems (refer to Figures 1 & 2).



50359A

a - Check Strainer for Restriction

**Figure 1. Raw Water Filter**



50360B

a - Check Water Pick-Up for Restriction  
b - O-Rings Leaking, Not Sealing  
c - Inlet Hose Tore or Kinked

**Figure 2. B.M.W. Stern Drive**

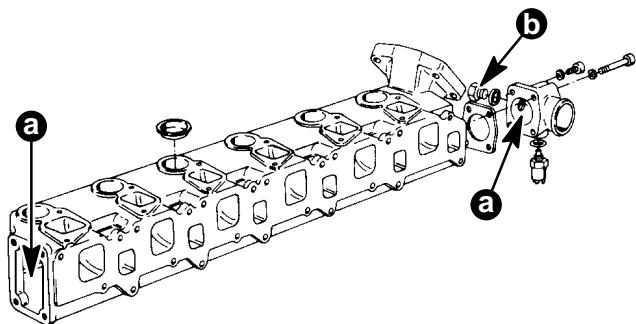
Other known problems are:

- Propeller ventilation (Inboard application)
  - Partially obstructed inlet sea water screen/cover
  - Interference of keel
  - Inlet hose collapsing during operation (must be wire reinforced hose).
7. Check for correct injection timing (refer to service manual specs).
  8. Using one of the following procedures check for exhaust gases entering closed cooling system.
    - a. Remove 1 in. (25mm) plug from rear of exhaust manifold (Figure 3, "b") and install water pressure gauge. If higher pressure is obtained than listed below, exhaust gases exist in system.

### Coolant System Pressure

800 RPM (idle) 6 PSI (41 kPa)

3800 RPM (WOT) 20 PSI (137 kPa)



50361C

a - Water Passages Restricted

b - Remove Plug for Exhaust Pressure Check

**Figure 3. Intake/Exhaust Manifold**

- b. Replace hose between heat exchanger and engine circulating pump with clear plastic hose. (Figure 4, "b") Watch for gas bubbles.
9. Check the following if excessive pressure or gas bubbles are found.
    - a. Head gasket leakage by making a compression test.
    - b. Exhaust gases existing in the closed cooling system by using a combustion leak tester.

**NOTE:** Snap-on Tools has combustion leak tester available for testing coolant for exhaust gases. (Block Combustion Leak Tester P/N GA170B)

Snap-on Tools are readily available. For the nearest dealer or distributor in your state/country, contact the Snap-on home office in the U.S.A.

Snap-on Tools

Kenosha, WI

Phone: 414-656-5200

Fax: 414-656-1403

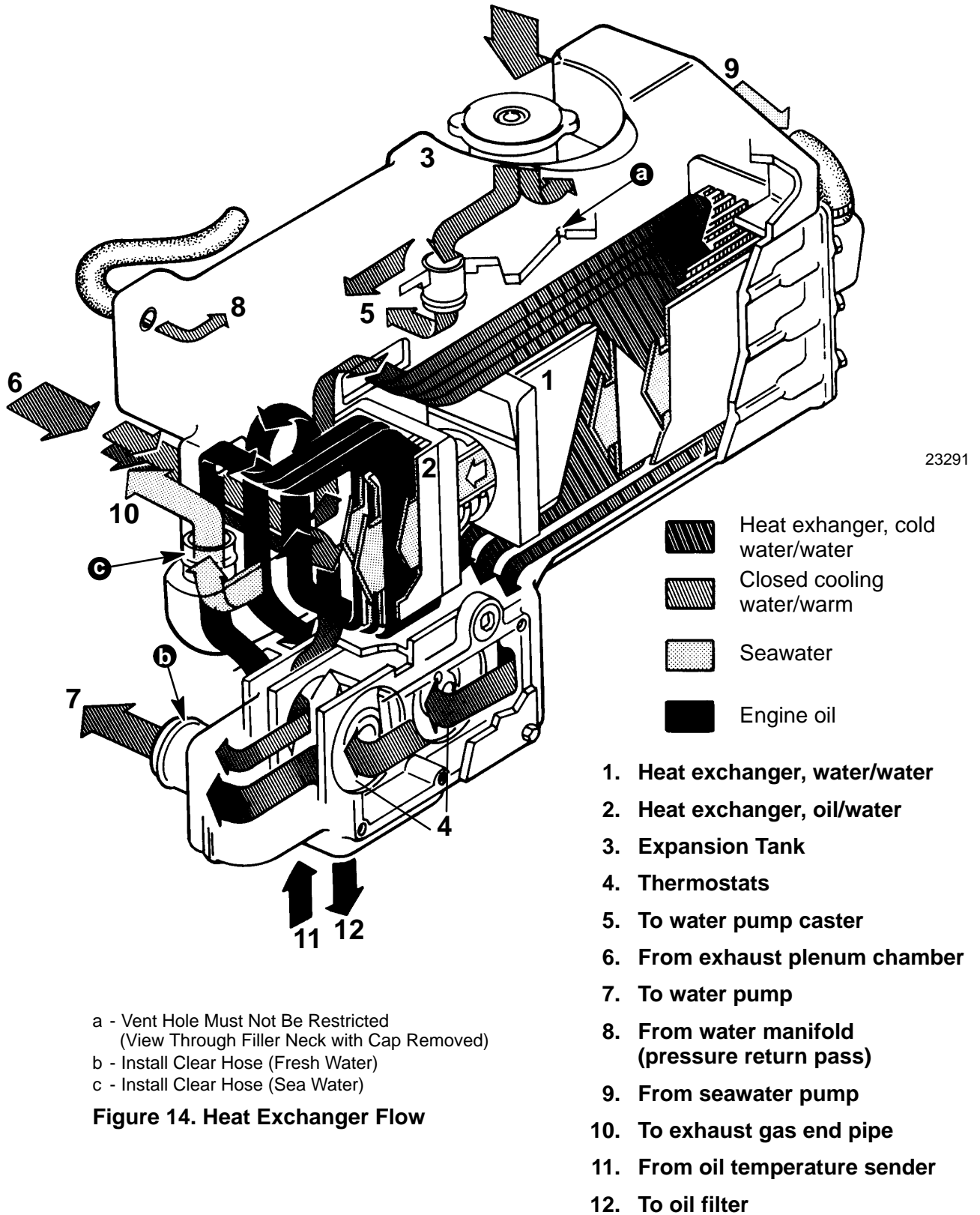
Telex: 431-1080 SNAP-ON-KNE

10. Check for air entering sea water cooling system.

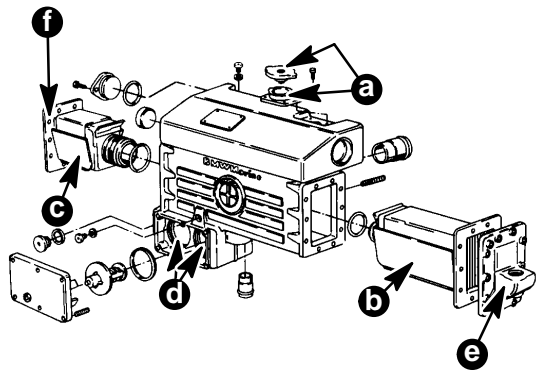
Replace hose between heat exchanger and exhaust elbow with clear hose. (Figure 4, "c") Watch for air bubbles. If air bubbles are present the complete sea water system must be checked for leaks.

11. Check if vent hole in heat exchanger directly under filler cap is open. (Figure 4, "a")

**IMPORTANT: Hole diameter must not be enlarged from original size of 3/32" (2.5mm).**



12. Check thermostats for proper opening degrees.  
170°F – 178°F (77°C – 81°C). (Figure 5, “d”)

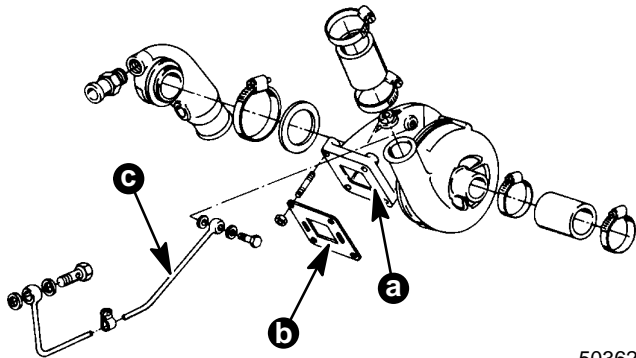


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- a - Replace with New Double Lip Seal Cap and Neck
- b - Coolant Exchanger
- c - Oil Exchanger
- d - Dual Thermostats
- e - Raw Water Outlet
- f - Raw Water Inlet (Not Shown)

**Figure 5. Heat Exchanger Tank**

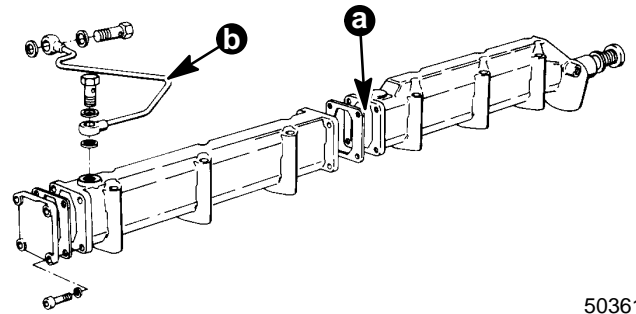
13. Check vent line from turbocharger to expansion tank (Figure 6, “c”) and from water manifold to expansion tank (Figure 7, “b”) are open.



50362

- a - Water Passages Restricted
- b - Gasket Leaking
- c - Vent Line Restricted

**Figure 6. Turbo Charger**



50361

- a - Water Passage Restricted
- b - Vent Line Plugged

**Figure 7. Water Manifold to Cylinder Heads**

If all previous steps are completed and the engine is still overheating, order a cooling system repair kit P/N 63832A25. The kit includes instructions for cleaning and flushing the entire cooling system and replacing and/or installing parts listed below.

**Repair Kit P/N 63832A25**

- New Circulating Pump
- Coolant Recovery Bottle
- Auxiliary Oil Cooler Kit
- Larger Sea Water Pump Cam
- Quicksilver Engine Coolant
- Quicksilver Cooling System Cleaner
- New Oil and Coolant Temp Senders
- Rubber Inserts
- New Heat Exchanger Filler Neck and Cap

**NOTE:** Instructions, packaged with the kit, **MUST BE** followed completely and correctly.